



## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<p>(51) International Patent Classification <sup>7</sup> : <b>A61J 3/00</b></p>	<p><b>A2</b></p>	<p>(11) International Publication Number: <b>WO 00/54724</b></p> <p>(43) International Publication Date: 21 September 2000 (21.09.00)</p>
<p>(21) International Application Number: <b>PCT/EP00/02222</b></p> <p>(22) International Filing Date: 14 March 2000 (14.03.00)</p> <p>(30) Priority Data: FI99A000052 16 March 1999 (16.03.99) IT</p> <p>(71) Applicant: <b>MOLTENI L. E C. DEI FRATELLI ALITTI SOCIETA' DI ESERCIZIO S.P.A.</b> [IT/IT]; Strada Statale 67, Tosco Romagnola, Località Granatieri, I-5018 Scandicci (IT).</p> <p>(72) Inventor: <b>ANGELI, Roberto</b>; Via dell'Acciaio 44, I-50018 Scandicci (IT).</p> <p>(74) Agent: <b>GERVASI, Gemma</b>; Notarbartolo &amp; Gervasi S.p.A., Corso di Porta Vittoria, 9, I-20122 Milan (IT).</p>		<p>(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).</p> <p><b>Published</b> <i>Without international search report and to be republished upon receipt of that report.</i></p>
<p>(54) Title: <b>PRECISION DISPENSER FOR LIQUIDS</b></p>		
<p>(57) Abstract</p> <p>A precision dispenser for liquids consisting of: a first pump (2) fed by a flask (1) containing liquid, connected thereto via an attachment (13) provided with a suction tube (16); an intermediate reservoir (3) fed by the first pump (2) and provided with one or more level probes (31-33); a second, high-precision, pump (4) downstream of said reservoir (3); a three-way solenoid valve (5) set downstream of the pump (4), from which it receives the liquid at input, and having two output ways, one output leading to the reservoir (3) and the other leading to a final receptacle (6) for collecting the liquid delivered; and a microprocessor unit for control and management of the pumps (2, 4), probes (31-33) and maintenance functions.</p>		

**FOR THE PURPOSES OF INFORMATION ONLY**

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MR	Mauritania	UA	Ukraine
BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
BY	Belarus	IS	Iceland	MX	Mexico	US	United States of America
CA	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NL	Netherlands	VN	Viet Nam
CG	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakhstan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	LI	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						

## PRECISION DISPENSER FOR LIQUIDS

### Field of the invention and prior art

The present invention regards a precision dispenser for controlled delivery of liquid products, in particular methadone or other medicinal preparations.

5 In the current state of the art, dispensers of liquid methadone are known in which a pre-set amount of liquid is taken from a feed reservoir by means of a peristaltic pump. The dose of liquid is then poured into a glass to be taken by the patient.

These known dispensers are moreover generally managed by a computer for identification and management of the administrations envisaged for the various  
10 patients.

However, the known dispensers present a number of drawbacks linked in particular to the precision that they are able to provide in dosing, this aspect being of particular consequence in the administration of methadone, both on account of the importance and delicacy of the cases treated, and on account of the need for  
15 being able to certify exactly the amounts of methadone actually supplied.

### Scope of the invention

A prime purpose of the present invention is therefore to provide a dispenser for liquid products, and in particular methadone, that affords high precision both in dosing and in calculating the quantities handled during operation.

### 20 Summary of the invention

The above purpose has been achieved according to the invention with a dispenser of liquid methadone, in which the hydraulic circuit comprises a sector for circulation of the liquid handled. The circulation makes it possible to set initial conditions that can be repeated in an identical manner at each new delivery. The  
25 circuit is moreover provided with an intermediate reservoir which is distinct from the supply flask and serves as a bleeder for possible air bubbles and has a check point for checking the amount of liquid present in the circuit, as well as for checking the temperature conditions.

The hydraulic circuit according to the invention comprises a first pump, preferably  
30 a peristaltic pump, which is fed by an interchangeable flask containing liquid and sends the liquid on to an intermediate reservoir. The output of the latter is connected, via a manual valve, to a second, high-precision, pump, preferably of

the piston type, and subsequently to a three-way solenoid valve, which has one output connected to the intermediate reservoir and the other output connected to the final receptacle of the amount of liquid to be delivered. The intermediate reservoir is equipped with level probes, and possibly with a temperature probe.

- 5 A first advantage is represented by the high precision achievable and the assurance of being able to repeat delivery of liquid with identical circuit starting conditions.

A second advantage is represented by the possibility of maintaining the liquid in movement when the device is not in use, so preventing any possible precipitation  
10 or separation of various phases.

These and other advantages will emerge more clearly from the ensuing description and from the annexed drawings, which are provided as a non-limiting example.

#### **Brief description of the drawings**

- 15 - Figure 1 shows a diagram of the dispenser according to the invention;  
- Figures 2.1, 2.2, 2.3, and 2.4 present a flowchart showing the various phases of the method according to the invention, in which P1 stands for Peristaltic pump, P2 stands for Piston pump, EV stands for Solenoid valve, S2 stands for Intermediate tank, M2 stands for Maximum level of S2. In particular, figures 2.1 and 2.2 relate to  
20 the filling and maintenance of level in intermediate reservoir (Routine 01) and figures 2.3 and 2.4 relate to the charging of circuit of main pump (Routine 02); and  
- Figures 3a and 3b present, respectively, a side view and a top view of a flask for the apparatus of Figure 1.

#### **Detailed description of the invention**

- 25 With reference to the attached figures, a dispenser according to the invention is made up of:

- a first pump 2, for example a peristaltic pump, fed, via pipes 12, by an interchangeable flask 1 containing liquid;
- an intermediate reservoir 3 fed, via pipes 21, by the first pump 2 and provided  
30 with one or more level probes 31-33, and possibly a temperature probe 34;
- a second, high-precision, pump 4, preferably of the type with one or more pistons, fed, via pipes 35 and valve 7, by the said reservoir 3;

- a three-way valve 5, set downstream of the pump 4, from which it receives the liquid at input, and having two output ways, one output leading, via pipes 51, to the reservoir 3, and the other leading, via further pipes 52, to a final receptacle 6 for collecting the liquid to be delivered; and
- 5 - a microprocessor unit for control and management of the pumps 2, 4, of the maintenance functions and of the probes 31-34.

According to the invention, and as may be seen from the attached drawings, the part of the hydraulic circuit between the reservoir 3 and the solenoid valve 5 makes up a circulation circuit H, in which the liquid can be made to circulate by  
10 means of the pump 4 and the three-way valve 5.

During operation, the pump 2 sucks up liquid from the flask 1 and sends it into the reservoir 3 until an appropriate level is reached (which is subsequently maintained), this being detected by the probes 31-33. If the level is sufficient, the pump 4 starts to circulate the liquid until it ensures complete filling of the pipes.

- 15 At the first request for delivery, the control unit opens the valve 5 for delivery (hence, of course, closing the circulation way) for the period of delivery of the amount of liquid required.

Advantageously, in the example described the pump is a piston-type pump (TRAVCYL<sup>®</sup>, MODEL 16, manufactured by Encynova International Inc.), which is  
20 operated by a stepper motor and in which, at every cycle of known duration, the amount of liquid displaced is known exactly.

In the event of pauses in use between successive deliveries that might cause changes in the state of the liquid or deviations with respect to the pre-set start-of-delivery conditions, the pump 4 carries out a predetermined number of cycles.

- 25 In order to guarantee the exact repetition of each delivery, the pump 4 is moreover provided with means for the determination of an initial zero, from which to start measurement of the amount being delivered. According to the invention, the pump 4 is then reset at each delivery and is brought back to a start-of-delivery position.

The above-mentioned means consist of an electromagnetic proximity sensor  
30 which acts as reference for the stroke of the pump piston and which controls advance of the stepper motor.

In the case where the dispenser is to be used for delivery of liquid methadone, it is

particularly important to guarantee complete delivery of the liquid contained in the flasks and, in addition, to ensure that it is possible to check also management of the flasks with certainty.

With reference to Figures 3a and 3b, the flasks according to the invention consist  
5 of a main body 1 provided with a threaded neck 8 for connection to a seal-type packing plug. The neck is moreover provided with teeth 81 for the bayonet joint of a coupling 13 for connection with the hydraulic circuit of the apparatus.

The bottom of the flask consists of a pair of surfaces 9, 91, which are slightly inclined and which converge into a hemispherical cup 93 which forms the lowest  
10 point of storage of the liquid in the flask.

A fin 92 is provided underneath the surface 9 to guarantee horizontal support for the flask in its housing on the apparatus.

In order to ensure that the suction tube 16 always draws from the minimum-level point of the cup 93, the tube is advantageously made so that it is integral with the  
15 attachment 13, which in turn finds a secure top reference point in the bayonet connection.

The flask 1 is further equipped with means of identification 12, which may be read by appropriate sensors 14 of the dispenser.

In a preferred embodiment, the said means 12 are of the RFID radio-frequency  
20 type, according to a recognition technique which is in itself already known, whilst the corresponding sensors 13 are fixed to the apparatus and connected to the control unit of the apparatus, which checks the volumes and the destination of the amounts delivered.

With reference to Figures 2.1 – 2.4, the invention further comprises a method for  
25 precision dosing of liquids, in particular by means of a dispenser of the type described above.

The method comprises the following steps:

- check of the control probes and sensors of the dispenser;
- charging, for example by means of a peristaltic pump fed by a flask containing  
30 the liquid to be delivered, of an intermediate reservoir S2 up to a maximum level M2 (routine 01) detected by a level probe;
- charging of a circulation circuit operated by a main pump P2 (routine 02), for

example of the piston type, the circuit extending from the reservoir S2 up to a delivery valve EV;

- in the case of a command for first delivery, charging of the spout of the flask for feeding the liquid, and search for a zero point of the pump; for subsequent  
5 deliveries with the same flask, search for the zero point of the pump;
- opening of the delivery valve EV and operation of the pump P2;
- execution of routine 01 for check on level of the reservoir S2;
- check on the amount delivered: if it corresponds to the amount envisaged, interruption of delivery and closing of the delivery valve EV; and  
10 - waiting for new command for delivery.

In addition, in the event of prolonged inactivity between successive deliveries, according to the method the circulation routine 02 is carried out to prevent any possible modifications in the state of the liquid (separation of phases, formation of air bubbles, etc.) present in the circuit of the pump 4.

- 15 The present invention has been described with reference to a preferred embodiment thereof, but it is understood that equivalent modifications may be made by a person skilled in the branch without thereby departing from the sphere of protection granted to the present patent for industrial invention.

**CLAIMS**

- 1 1. A precision dispenser for liquids consisting of:
  - 2 - a first pump (2), fed by a flask (1) containing liquid, connected by means of an
  - 3 attachment (13) provided with a suction tube (16);
  - 4 - an intermediate reservoir (3) fed by the first pump (2) and provided with one or
  - 5 more level probes (31-33);
  - 6 - a second, high-precision, pump (4) downstream of said reservoir 3;
  - 7 - a three-way solenoid valve (5), set downstream of the pump (4), from which it
  - 8 receives the liquid at input, and having two output ways, one output leading to the
  - 9 reservoir (3), and the other leading to a final receptacle (6) for collecting the liquid
  - 10 to be delivered; and
  - 11 - a microprocessor unit for control and management of the pumps (2, 4), of the
  - 12 probes (31-34) and of the maintenance functions.
- 1 2. A dispenser according to Claim 1, characterized in that the part of the hydraulic
- 2 circuit between the reservoir (3) and the solenoid valve (5) forms a circulation
- 3 circuit H in which the liquid can be circulated by means of the pump (4) and the
- 4 three-way valve (5).
- 1 3. A dispenser according to Claim 2, characterized in that the pump (4) is of the
- 2 type with one or more pistons, operated by a stepper motor.
- 1 4. A dispenser according to Claim 1, characterized in that it comprises means for
- 2 seeking a zero point of start of each delivery of the pump (4).
- 1 5. A dispenser according to Claim 4, characterized in that the said means are
- 2 constituted by a proximity sensor capable of detecting the position of the pistons of
- 3 the pump and controlling advance of the stepper motor.
- 1 6. A dispenser according to Claim 1, characterized in that it comprises means (14)
- 2 for identifying the flask of liquid used.
- 1 7. A dispenser according to Claim 6, characterized in that the said means are
- 2 RFID sensors.
- 1 8. A dispenser according to Claim 1, characterized in that it comprises a
- 2 temperature probe (34).
- 1 9. A dispenser according to Claim 1, characterized in that the said suction tube



2 (16) is integral with the said attachment (13).

1 10. A flask for liquids, for use in dispensers according to at least one of Claims 1-  
2 9, characterized in that it consists of a main body (1) provided with a threaded  
3 neck (8) equipped with means (81) for the press-block coupling of an attachment  
4 (13) of a dispenser, in which the bottom of the flask consists of a pair of surfaces  
5 (9, 91), which are inclined and which converge centrally into a cup (93) forming the  
6 lowest point of storage of the liquid in the flask (1).

1 11. A flask according to Claim 10, characterized in that the said means (81)  
2 consists of a bayonet coupling.

1 12. A flask according to Claim 10, characterized in that a fin (92) is provided  
2 underneath the surface (9) to guarantee horizontal support for the flask in its  
3 housing on the dispenser.

1 13. A flask according to Claim 10, characterized in that it is equipped with means  
2 of identification (12), which may be read by appropriate means (14) of the  
3 dispenser.

1 14. A flask according to Claim 13, characterized in that the said means (12) are of  
2 the RFID type.

1 15. A flask according to Claim 10, characterized in that it is made of plastic  
2 material.

1 16. A method for dosing liquids, comprising the following steps:

- 2 - check of the control probes and sensors of the dispenser;
- 3 - charging, for example by means of peristaltic pump fed by a flask containing the  
4 liquid to be delivered, of an intermediate reservoir S2 up to a maximum level M2  
5 (routine 01) detected by a level probe;
- 6 - charging of a circulation circuit operated by a main pump P2 (routine 02), for  
7 example of the piston type, the circuit extending from the reservoir S2 up to a  
8 multi-way delivery valve EV;
- 9 - in the case of a command for first delivery, charging of the spout of the flask for  
10 feeding the liquid, and search for a zero point of the pump; for subsequent  
11 deliveries with the same flask, search for the zero point of the pump;
- 12 - opening of the delivery valve EV and operation of the pump P2;
- 13 - execution of routine 01 for check on level of the reservoir S2;

- 14 - check on the amount delivered: if it corresponds to the amount envisaged,  
15 interruption of delivery and closing of the delivery valve EV; and  
16 - waiting for new command for delivery.
- 1 17. Method according to Claim 16, in which in the event of prolonged inactivity  
2 between successive deliveries, the circulation routine 02 is carried out to prevent  
3 any possible modifications in the state of the liquid present in the circuit of the  
4 pump 4.

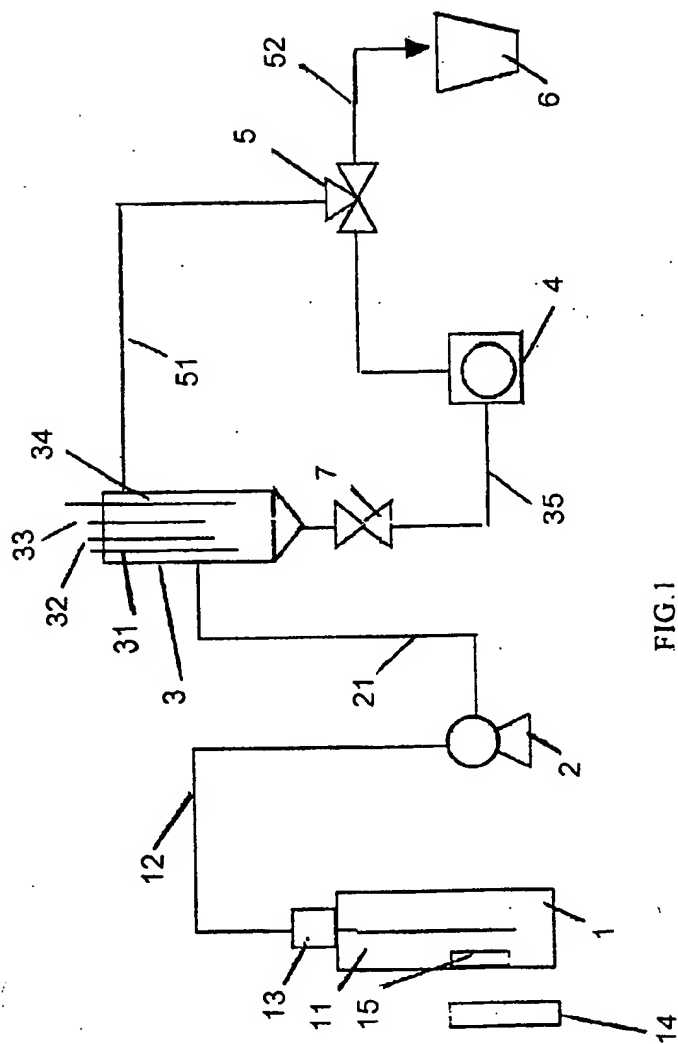


FIG. 1

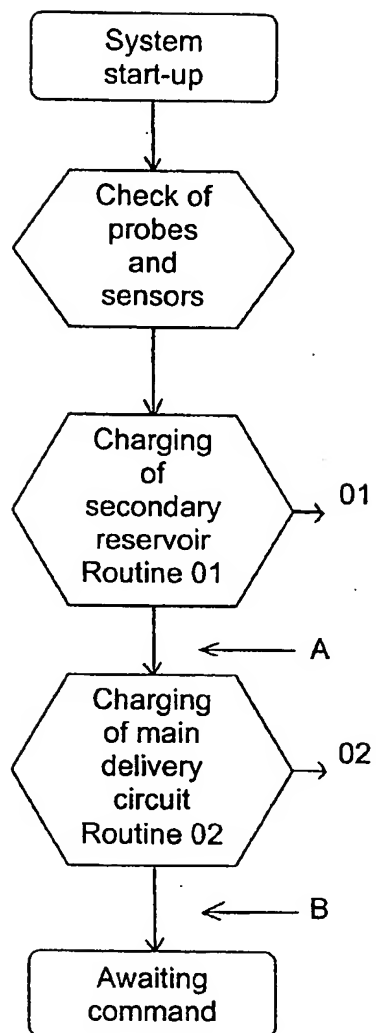


Figure 2.1

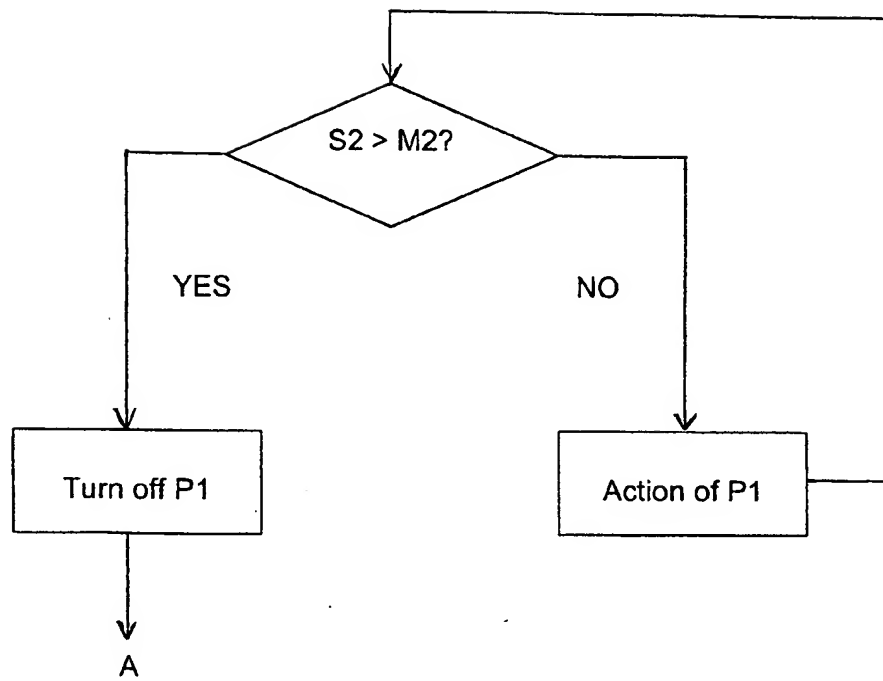


Figure 2.2

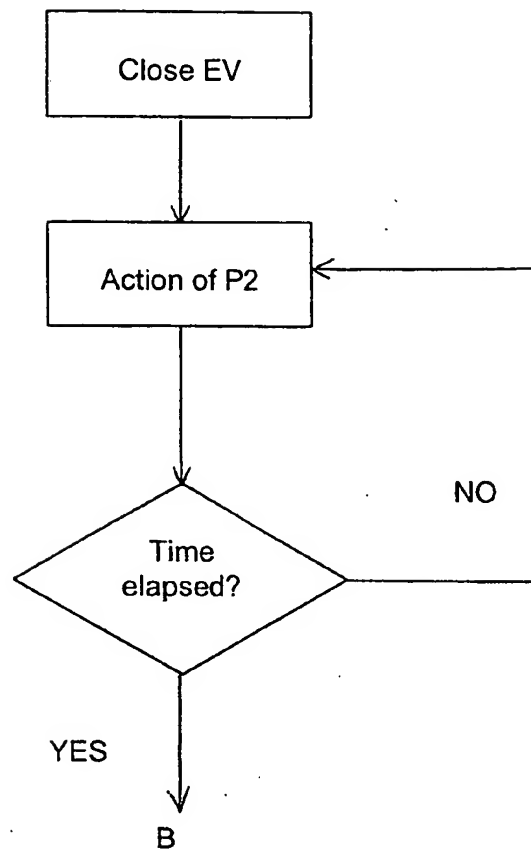


Figure 2.3

5/6

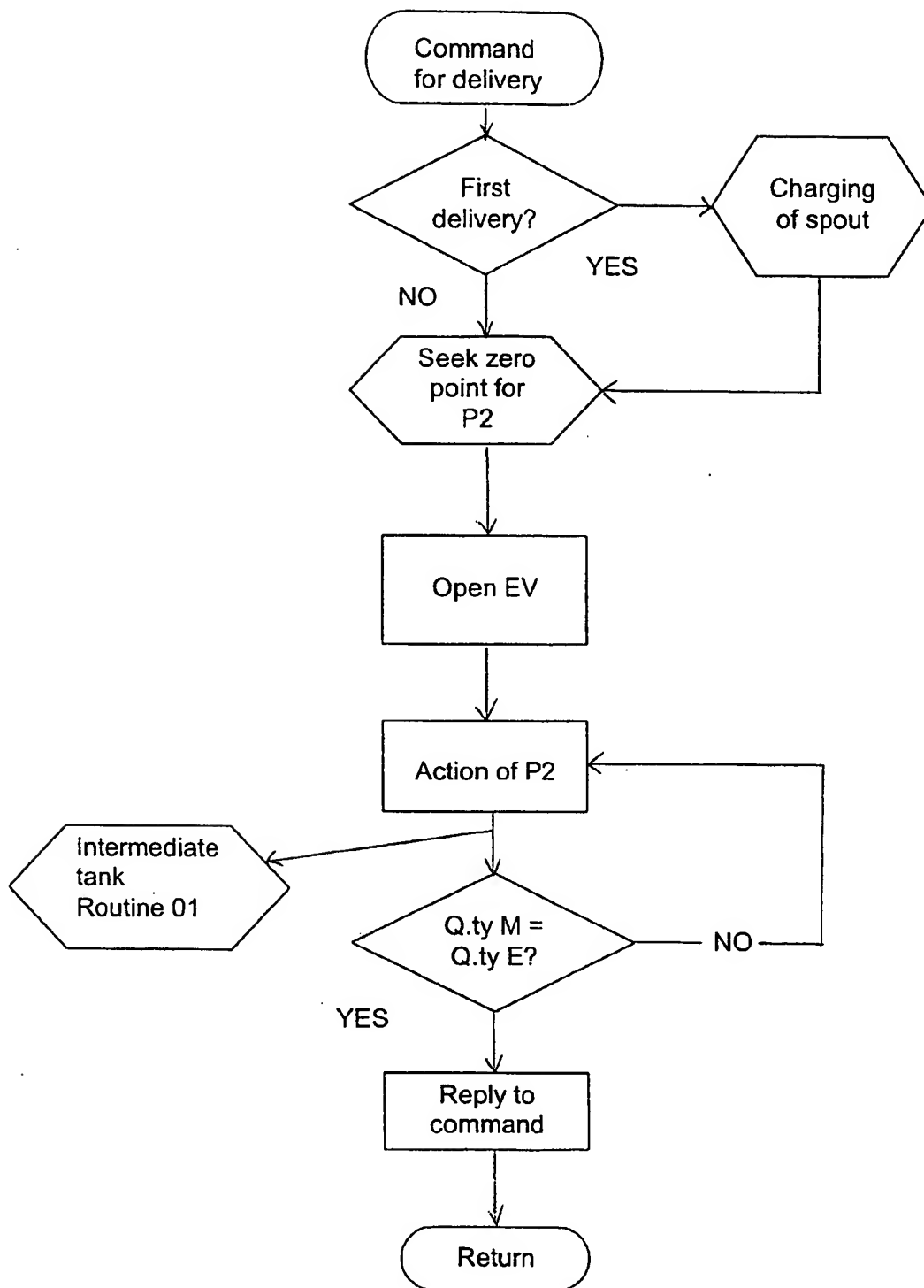
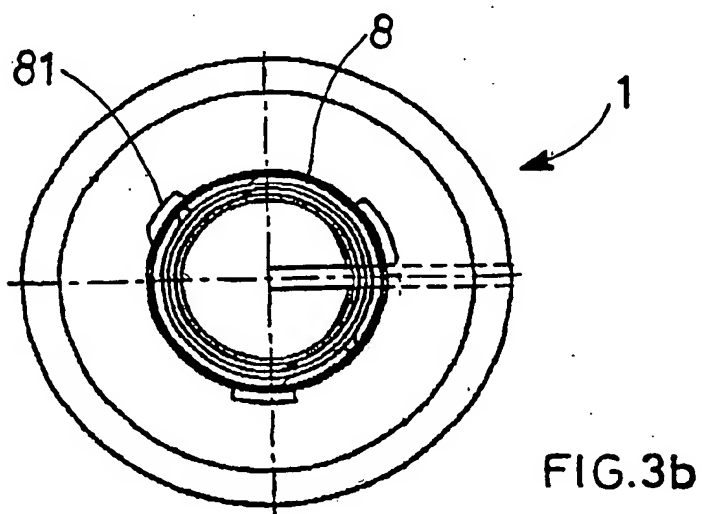
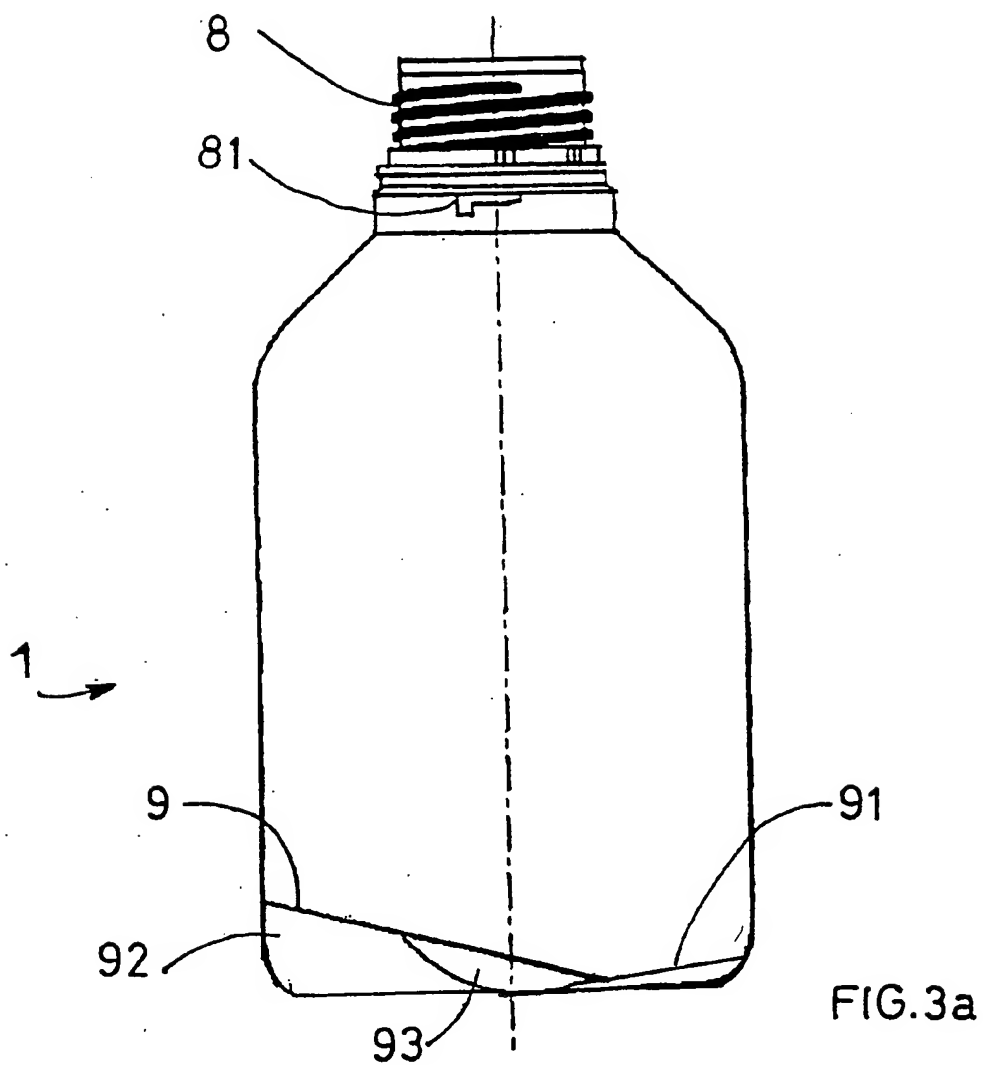


Figure 2.4





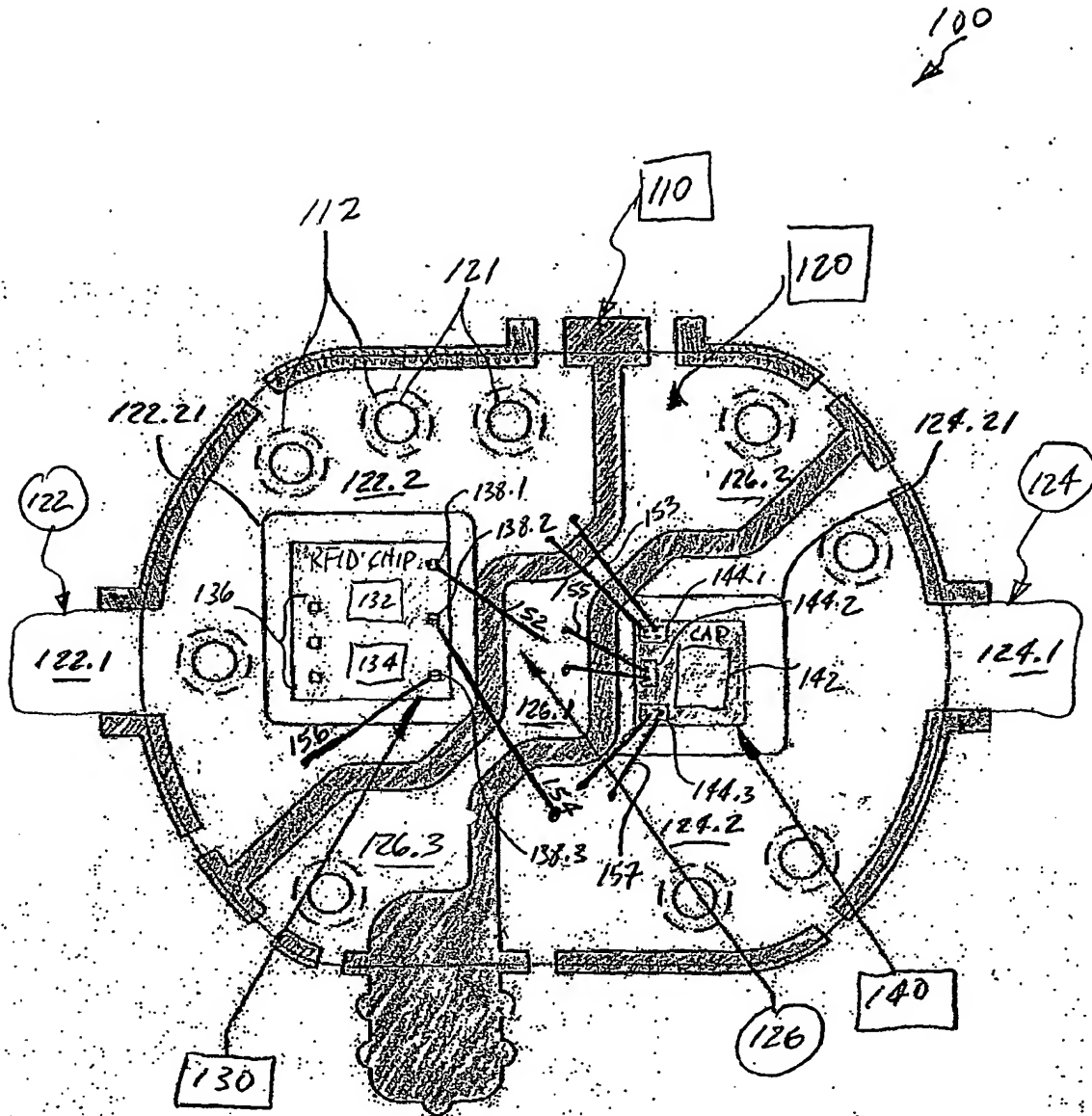


FIG. 1

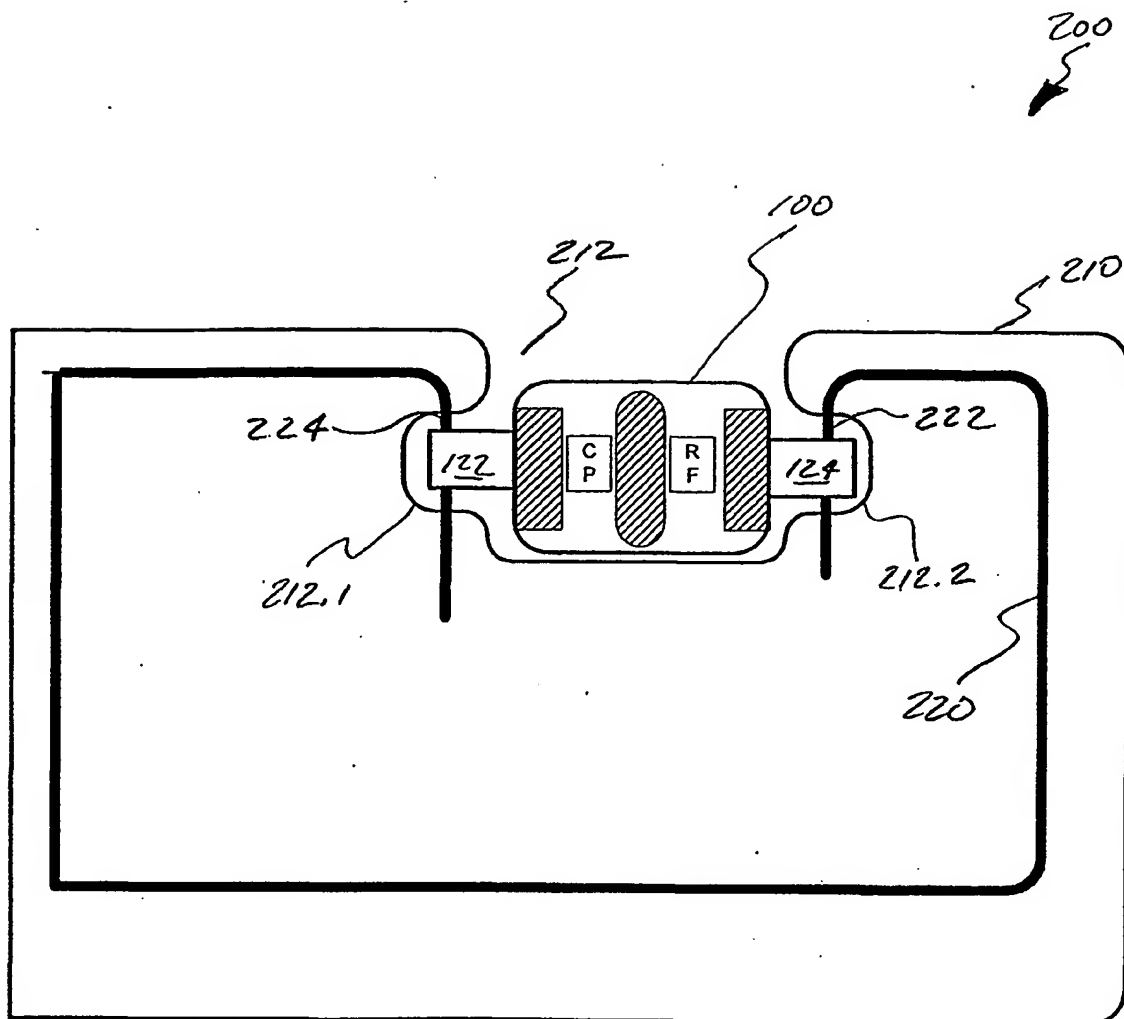


FIG. 2

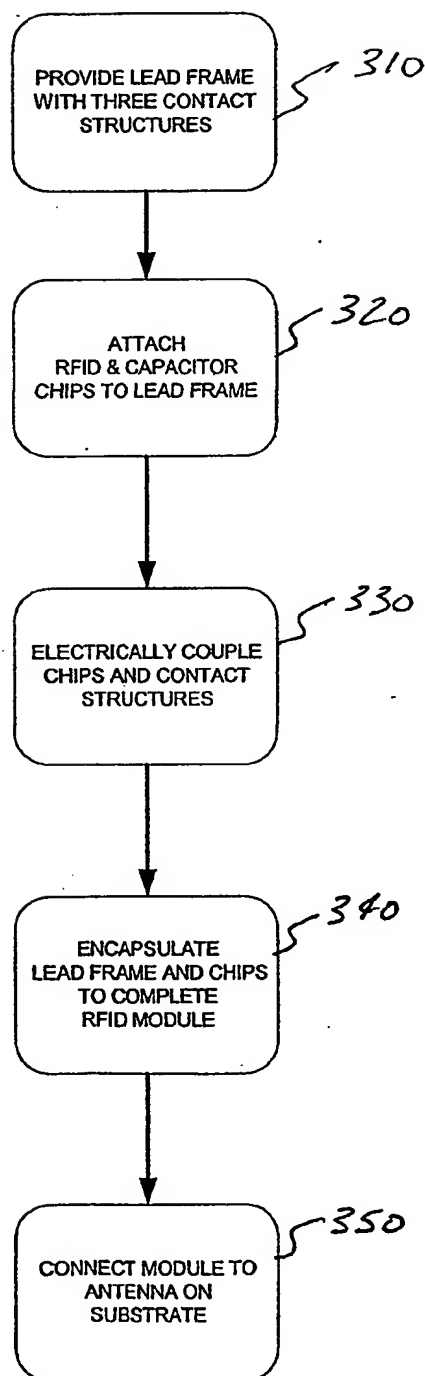
300

FIG. 3

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
21 September 2000 (21.09.2000)

PCT

(10) International Publication Number  
WO 00/54724 A3

(51) International Patent Classification<sup>7</sup>: A61J 3/00

(21) International Application Number: PCT/EP00/02222

(22) International Filing Date: 14 March 2000 (14.03.2000)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
FI99A000052 16 March 1999 (16.03.1999) IT

(71) Applicant: MOLteni L. E C. DEI FRATELLI  
ALITTI SOCIETÀ DI ESERCIZIO S.p.A. [IT/IT];  
Strada Statale 67, Tosco Romagnola, Località Granatieri,  
I-50118 Scandicci (IT).

(72) Inventor: ANGELI, Roberto; Via dell'Acciaio 44,  
I-50018 Scandicci (IT).

(74) Agent: GERVASI, Gemma; Notarbartolo & Gervasi  
S.p.A., Corso di Porta Vittoria, 9, I-20122 Milan (IT).

(81) Designated States (*national*): AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW.

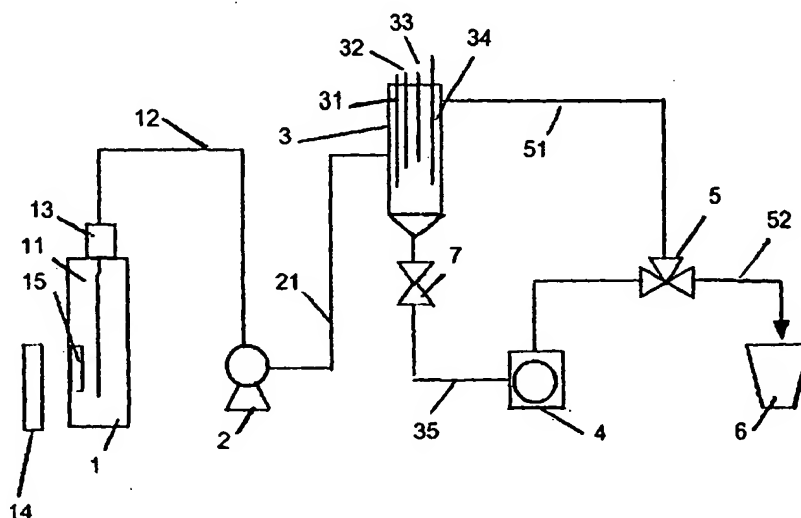
(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published:  
— With international search report.

(88) Date of publication of the international search report:  
21 December 2000

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: PRECISION DISPENSER FOR LIQUIDS



(57) Abstract: A precision dispenser for liquids consisting of: a first pump (2) fed by a flask (1) containing liquid, connected thereto via an attachment (13) provided with a suction tube (16); an intermediate reservoir (3) fed by the first pump (2) and provided with one or more level probes (31-33); a second, high-precision, pump (4) downstream of said reservoir (3); a three-way solenoid valve (5) set downstream of the pump (4), from which it receives the liquid at input, and having two output ways, one output leading to the reservoir (3) and the other leading to a final receptacle (6) for collecting the liquid delivered; and a microprocessor unit for control and management of the pumps (2, 4), probes (31-33) and maintenance functions.

WO 00/54724 A3

# INTERNATIONAL SEARCH REPORT

Inter. onal Application No

PCT/EP 00/02222

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A61J3/00

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A61J G07F G01N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CH 456 885 A (OLLAND F W) 31 July 1968 (1968-07-31) the whole document	1,2,8,16
A	--- PATENT ABSTRACTS OF JAPAN vol. 014, no. 057 (C-0684), 2 February 1990 (1990-02-02) & JP 01 284327 A (KANEBO LTD), 15 November 1989 (1989-11-15) abstract	1,2,16
A	--- EP 0 763 728 A (SCITEC KABUSHIKI KAISHA ; TOA ELECTRONICS (JP)) 19 March 1997 (1997-03-19) column 15, line 3 -column 16, line 57; figure 15	1,2,8,16
	--- -/-	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

### \* Special categories of cited documents :

- \*A\* document defining the general state of the art which is not considered to be of particular relevance.
- \*E\* earlier document but published on or after the international filing date.
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

- \*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- \*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- \*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- \*&\* document member of the same patent family

Date of the actual completion of the international search

7 July 2000

Date of mailing of the international search report

22.08.00

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Rosenblatt, T

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 00/02222

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>US 3 887 110 A (PORTER LAWRENCE C)  3 June 1975 (1975-06-03)  column 3, line 59 -column 4, line 6;  figure 2</p> <p>-----</p>	1,3

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/EP 00/02222

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2. ☐ Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
  
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
  
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
  
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
  
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-9, 16, 17

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

1. Claims: 1-9,16,17

precision dispenser for liquids and method for dosing liquids

2. Claims: 10-15

flask for liquids



# INTERNATIONAL SEARCH REPORT

Information on patent family members

Inter. Jnal Application No

PCT/EP 00/02222

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
CH 456885 A		NONE	
JP 01284327 A	15-11-1989	NONE	
EP 0763728 A	19-03-1997	US 5900136 A US 5762769 A WO 9630749 A	04-05-1999 09-06-1998 03-10-1996
US 3887110 A	03-06-1975	NONE	

**This Page is Inserted by IFW Indexing and Scanning  
Operations and is not part of the Official Record**

**BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ BLACK BORDERS
- ☐ IMAGE CUT OFF AT TOP, BOTTOM OR SIDES
- ☐ FADED TEXT OR DRAWING
- ☐ BLURRED OR ILLEGIBLE TEXT OR DRAWING
- ☐ SKEWED/SLANTED IMAGES
- ☐ COLOR OR BLACK AND WHITE PHOTOGRAPHS
- ☐ GRAY SCALE DOCUMENTS
- ☐ LINES OR MARKS ON ORIGINAL DOCUMENT
- ☒ REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY
- ☐ OTHER: \_\_\_\_\_

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.**